National STEM Olympiad 2019

"Artificial Intelligence for Sustainable Farming"

May 29 - 31, 2019

ROYAL EDUCATION COUNCIL

PARO

PROGRAMME AND GUIDELINES

INTRODUCTION

National STEM Olympiad is a three-day programme, devoted to improve the quality of STEM education. This programme is expected to spark students' interest in STEM related areas and provide recognition for outstanding achievement in STEM education. The STEM Olympiad programme is a rigorous academic interscholastic competition that consist of team events, individual scholastic works which students and teachers prepare on the given theme. These challenging and motivational events are well balanced between the various science disciplines, mathematics, and technology.

Generating knowledge and understanding through STEM equips people to find solutions to today's emerging challenges and achieve the national goal of sustainable development and greener society. The STEM subjects provide greater scope to mitigate the emerging national and global issues in terms of food security and the wellbeing of people and the world at large. The emerging field in the areas of science and technology is artificial intelligence. Artificial intelligence is used for solving some of the emerging issues across the world. Therefore, the theme for National STEM Olympiad 2019 is "**Artificial Intelligence for Sustainable Farming"**.
The event is organised with the following broad objectives:

Objectives:

- Provide a platform for teachers and students to showcase their scholarly works and appreciate the contribution of STEM subjects to solve the contemporary issues.
- Provide opportunities for students to explore hands-on applications through collaboration and discussion.
- To challenge students to come up with innovative and creative ideas to solve real world problems.
- Provide opportunities for participants and guests to experienced hands-on activities.
- Instil in learners, the positive attitude and values for science and technology.

PROGRAMMES AND ACTIVITIES

The National STEM Olympiad 2019 has three events: Exhibition, Symposium, and Fun Activities.

A. Exhibition

In this event, schools submit their proposal to REC. The challenging task of this event is writing and submitting the proposal which demands research and collaboration of ideas within the given time. It involves planning, designing, creating, innovating, and team work that test the aptitude, knowledge, and skills of the participants. This event takes place in three stages based on the following guidelines:

Stage 1: Submission of Proposal

1.1. Guidelines for the Submission of Proposal

a. All MSS, CS, and HSS **must** submit **one proposal** to the Royal Education Council on or before **April 2, 2019.**
b. The proposal must be relevant to the theme of the STEM Olympiad 2019.
c. The proposal should be submitted in .doc or .docx format (soft copy) along with the dully filled registration form (*Annexure 1*) to Phuntsho Norbu at phuntshonorbu@rec.gov.bt
d. A team should work on only one proposal. A team shall comprise of six students (3 girls and 3 boys) and a Mentor Teacher.
e. The proposal must contain the idea of **only one** prototype.
f. The proposal must be developed using the template given in *Annexure 2*.
g. The proposal must be planned and prepared by students themselves. However, the mentor teacher can assist the students as and when required.
h. Of all the proposals submitted, 20 best proposals representing 20 schools will be selected after the evaluation by a committee as per the assessment tool given in **table 1.3.**
i. The decision of the selection committee is final and binding.
j. The selection result will be informed to all the participating schools by **April 12, 2019.**
k. Twenty selected schools will be provided with rapid prototype software, robotic kits hardware, and training.
l. The robotic kits hardware must be returned to REC after the completion of the programme. On failing to return, the school must bear the actual price of the robotic kits.
m. The Royal Education Council reserves the right to publish the content of the selected proposals in any media.

1.2. Terms of Reference for Proposal Paper Evaluators

a. Ensure that proposals are assessed in strict adherence to the criteria and strategies.
b. Each proposal shall be evaluated at least by three evaluators.
c. Points awarded for each entry must be clear, signed if overwritten, and summed correctly using PENS only.
d. Ensure that the papers indicate original work of students and are based on the theme of the STEM Olympiad 2019.
e. Judges have right to disqualify and not to evaluate any proposal if it bears evidence of duplication or does not adhere to the theme.
f. Evaluators shall complete the evaluation of all the papers on or before **April 10, 2019** and submit the duly signed score sheet to REC.
g. Selection committee (evaluators and working committee) will finalise 20 schools with best proposals based on the grand total points obtained from at least three evaluators.
h. TA/DA shall be paid to the evaluators as per the existing RGoB financial rules.

1.3. Assessment tool for the Evaluation of Proposal Papers

Name of the Proposal:
Name of the School:
Dzongkhag/Thromde:

Name of Mentor Teacher:	
Boys	**Girls**
Name: Class: Student Code No:	Name: Class: Student Code No:
Name: Class: Student Code No:	Name: Class: Student Code No:
Name: Class: Student Code No:	Name: Class: Student Code No:

Descriptors:

4 points: **Strongly Agree** - *excellent, advances, exemplary or amazing*

3 points: **Agree** - *good, accomplished or proficient*

2 points: **Neutral** - *average, intermediate level or acceptable*

1 point: **Disagree** - *attempted but needs work*

0 point: **Strongly Disagree** - *little attempt or needs lots of help*

Sl No	Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Proposal is relevant to the theme of the Olympiad					
2	Proposal is relevant to the objectives of the Olympiad					
3	Aims of the proposal are realistic					

4	There are evidence (s) that prove the originality of the proposed product					
5	Design specifications of the proposed product are unique.					
6	Proposed product has the commercial values					
7	Proposal provides the opportunities for collaboration.					
8	Proposal has implementation schedule					
9	Proposal emphasises the stages of prototype development					
10	Proposal has Illustrations/ photos/diagrams/ apparatus/ sketches of the proposed product					
11	Constraints are explained					
12	Proposed prototype is scalable.					
13	Proposed product has low development costs.					

Score Sheet for proposal paper

(Use Pens only for marking)

Sl. No.	Name of prototype	Name of the School	Points			
			Evaluator 1	Evaluator 2	Evaluator 3	Grand Total
1						
2						

Evaluator Name & Signature

Evaluator Name & Signature

Evaluator Name & Signature

Stage 2: School-Level Prototype Development

2.1. Guidelines for Prototype Selection for National Level

a. All 20 selected schools should complete the development of the prototype **by May 10, 2019.**
b. The rapid prototype developed should not be bigger than 60 cm x 60 cm.
c. An evaluation team will visit the selected schools to evaluate the Prototype within the time frame of May **11-20, 2019.** The evaluation shall be carried out using criteria given in **table 2.4.** This part will carry 90% of the weightage.
d. An evaluation team will administer cognitive test to the participants and this part will carry 10% of the weightage.
e. An evaluation team will select 16 best prototypes to participate at the National level STEM Olympiad 2019 based on the highest points obtained.
f. **Selection result, date and venue** will be informed to 20 schools latest by **May 22, 2019**

2.2. Guidelines for Cognitive Test

a. There will be a written cognitive test for all the participants on areas of artificial intelligence.
b. Test must be conducted with highest standards of integrity and fairness.
c. During the conduct of test, an observer may be invited to ensure fairness.
d. Cognitive test will be administered and evaluated by the visiting team.
e. A total of 10 MCQ items will be tested for a duration of 20 minutes.
f. The point scored by the team is equal to the average of the points scored by each team member.
g. The weightage of the test will be 10% of the overall score [cognitive test (10%) + prototype (90%)].

2.3. Terms of Reference for Prototype Evaluators

a. Evaluators for school level prototypes will comprise of officials from STEM Unit (REC) and other relevant professionals.
b. Evaluators shall convene meeting to finalise the strategies of evaluating the prototype and conduct of test in 20 selected schools.
c. Every evaluator must have the clear understanding of objective of the field visit, method and criteria for the evaluation of prototype, and administration and evaluation of cognitive test.
d. The prototype must be evaluated by a group of evaluator.
e. All the evaluators of a group must assess the prototype and the final score is the average of all the points scored. The weightage of the of the prototype will be 90% of the overall score.
f. The evaluators must administer and evaluate the cognitive test to all the participants and the total points scored will be awarded a weightage of 10%.
g. The overall score for the school is the sum of the final score of the prototype (90%) and the cognitive test (10%).
h. Points awarded for each prototype and cognitive test must be clear, signed if over-written and summed correctly using PENS only.
i. Evaluators have rights to disqualify or not to evaluate any prototype if it bears enough evidence that it does not adhere to the proposal submitted.
j. The points awarded by the evaluators will be final and binding.
k. The selection committee (evaluators and working committee) will finalize 16 best prototypes to participate at the National STEM Olympiad 2019.
l. TA/DA shall be paid as per the existing RGoB financial rules.

2.4. Assessment tool for Evaluation of Prototype

Name of the Prototype:
Name of the School:
Dzongkhag/Thromde:

Name of Mentor Teacher:	
Boys	**Girls**
Name: Class: Student Code No:	Name: Class: Student Code No:
Name: Class: Student Code No:	Name: Class: Student Code No:
Name : Class: Student Code No:	Name: Class: Student Code No:

Descriptors:

4 points: **Strongly agree** - *excellent, advances, exemplary or amazing*

3 points: **Agree** - *good, accomplished or proficient*

2 points: **Neutral** - *average, intermediate level or acceptable*

1 point: **Disagree** - *attempted but needs work*

0 point: **Strongly Disagree** - *little attempt or needs lots of help*

Sl no	Criteria A. Design & Concept	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	The rapid prototype relates to objectives of the Olympiad.					
2.	The rapid prototype satisfies the purpose stated.					
3.	The rapid prototype is unique					

Sl no	Criteria B. Structure and function	Strongly Agree	Agree	Neutral	Somewhat disagree	Disagree
4.	The rapid prototype is able to perform the given task (10 boxes) in 1 minute					
5.	The rapid prototype is appropriate in size (maximum 60x60cm) in relation to its functions					
6.	The rapid prototype can be easily operated by all team members.					
8.	The rapid prototype has appealing aesthetic appearance.					
9.	Attention to detail is given while developing and constructing rapid prototype.					
10.	Ergonomics considerations are evident in design of rapid prototype.					

Sl no	Criteria C. Team Presentation	Strongly Agree	Agree	Neutral	Somewhat disagree	Disagree
11	Clear responses provided to questions by the judges					
12	The demonstration of the rapid prototype is impressive					
13	Clear explanations is provided on the rapid prototype					
14	Illustrations, photos, diagrams, apparatus as a supporting documentation displayed to clearly state every aspects of the entire journey					
15	Balanced division of responsibilities among all members of team evident					

Score Sheet for Prototype at School Level

(Use Pens only for marking)

Sl. No.	Name of prototype	Name of the School	Points			
			Evaluator 1	Evaluator 2	Evaluator 3	Grand Total
1						
2						
3						

Evaluator Name & Signature 1:

Evaluator Name & Signature 2:

Evaluator Name & Signature 3:

Stage 3: National STEM Olympiad 2019

3.1. Guidelines for National STEM Olympiad 2019

a. The teams of all 16 selected schools shall report to the venue on the evening of **May 27, 2019.**
b. Upon arrival at the venue, the escort teacher should contact Mr. Karma Dorji (Mobile No. 17846315) and Mr. Phuntsho Norbu (Mobile No. 17370573) for registration and logistics.
c. During the registration, participating schools are required to submit a copy of the following:
    - ✓ Approval letter from the Dzongkhag/Thromde to participate in the event,
    - ✓ Duly filled form (*Annexure 3*)
    - ✓ Written consent (*Annexure 4*) for the participating students from their parent/guardian.
    - ✓ Prototype Report Booklet (*Annexure 5*)
d. The selected schools shall be responsible for the safe transportation of the team. The expenditure incurred for transportation including DSA of the driver shall be borne by the participating school.
e. Food and lodge from the evening of **May 27, 2019** to morning of **June 1, 2019** will be provided by the organizer.
f. The entitlements for students will be paid as per the existing financial rule only for the journey from the school to the venue and back.
g. The entitlement for the escort teachers will be paid as per the existing financial rules. However, no TA will be paid as the transportation is arranged by the school.
h. The selected schools shall be provided with uniform banners with school logo. The schools should also bring their school flags
i. The selected schools will be allocated a space based on lucky draw to display their prototype one day before the main event. **(May 28, 2019)**
j. The selected teams will compete on **May 29 - 31, 2019** in league round, qualifying round, semi-final round, and final round.
k. The final match will be played on **May 31, 2019**.
l. The exhibits will be opened to the general public on **May 30 - 31, 2019**
m. The different award categories of National STEM Olympiad 2019 are as follows:
    - ➢ First: Nu 75,000, Champion Trophy, and Certificates
    - ➢ Second: Nu 60,000 and Certificates
    - ➢ Third: Nu 45,000 and Certificates
    - ➢ 13 Consolation Prizes: Nu. 10,000 and Certificate
n. The prizes received must be used for promotion of science education programmes in the school and report should be sent to REC, Paro (bhojraj@ rec.gov.bt).
o. A certificate will be awarded to the students and mentor teachers of 4 participating schools who cannot make it to National STEM Olympiad 2019.
p. A certificate will be awarded to the students and mentor teachers of 20 participating schools by the **SolidWorks.**
q. The winning team will be given opportunity to participate in **FIRST GLOBAL CHALLENGE** which will be held in Dubai from **October 3 - 5, 2019.** ***(14 to 18 years only)***

3.2 Competition modality for 16 selected teams

3.2.1 League round

a. The sixteen (16) selected teams will be placed in different pools based on lucky draw on arrival to the venue as given in **Table 3.2.1**
b. Irrespective of the pools, the teams will be clubbed into 8 groups comprising of 2 teams (Alliance team).
c. Each alliance in league round will get three matches to play.
d. Each match in league round will of three minutes.
e. The alliance that collects the maximum farm machineries (cubes), seeds (cardboard), and water (TT balls) in farm station during the stipulated time will be declared as winner. (Refer ***Annexure 6*** for score details)
f. The winner alliance in league round shall fetch 3 scores and loser shall fetch 1 score. 2 scores will be awarded if the match ends with draw.
g. The scores secured in the match will be accumulated for individual ranking.
h. The total points secured by performing the task (carrying farm machineries, water and seed) for three matches will be taken into account for tie breaking in the event of tie scores to decide the winning team and runners up team. In the event of second tie, the teams will be made to compete individually after drawing the fixture on site in presence of teams with same scores.
i. The winner and runners up from each pool will enter into qualifying round.

3.2.2. Qualifying round

1. The match will be played as an individual team.
2. The match between the teams will be played as per the fixture given in **Table 3.2.4**
3. Each match in this round will of five minutes.
4. The winning teams from each match will enter into semi-final based on highest points secured during the match ***(Annexure 6).***

3.2.3 Semi-final

1. The winning teams from qualifying round will play the match as per the fixture given in **Table 3.2.5**
2. Each match in this round will be of five minutes.
3. The winning teams from each match will enter into final based on highest points secured during the match ***(Annexure 6).***
4. The two losing teams from this round will compete for third position based on highest points secured during the match ***(Annexure 6).***

3.2.4. Final

1. The two winning teams from semi-final will play the final match.
2. The match in this round will be of ten minutes.
3. The winning team will be declared as Champion based on highest points secured during the match ***(Annexure 6).***

Table 3.2.1: Pool Division

Pool A		Pool B		Pool C		Pool D	
Team	Name of School	Team	Name of School	Team	Name of School	Team	Name of School
1		5		9		13	
2		6		10		14	
3		7		11		15	
4		8		12		16	

Table 3.2.2: League Round

Date	Match No	Alliance Matches
May 29, 2019	I	(Team 1 & Team 2) vs (Team 3 & Team 4)
	II	(Team 5 & Team 6) vs (Team 7 & Team 8)
	III	(Team 9 & Team 10) vs (Team 11 & Team 12)
	IV	(Team 13 & Team 14) vs (Team 15 &Team 16)
	V	(Team 1 & Team 3) vs (Team 2 & Team 4)
	VI	(Team 5 & Team 7) vs (Team 6 & Team 8)
	VII	(Team 9 & Team 11) vs (Team 10 & Team 12)
	VIII	(Team 13 & Team 15) vs (Team 14 & Team 16)
	IX	(Team 1 & Team 4) vs (Team 2 & Team 3)
	X	(Team 5 & Team 8) vs (Team 6 & Team 7)
	XI	(Team 9 & Team 12) vs (Team 10 & Team 11)
	XII	(Team 13 &Team 16) vs (Team 14 & Team 15)

Table 3.2.3: Score Sheet for League Round

Pool	Teams	Match	Points										Scores and Results			
			Water (TT Ball)		Farming Machineries (10cm X 10 Cm cube)		Seed (10cm X 10cm T-shaped Cardboard)		Parking (Optional)			Total Points (a+b+c+d+e+f)				
			No. of TT ball	a. Points (1b=5)	No. of cubes	b. Points (1C=10)	No. of Cardboard	c. Points (1CB=10)	d. SC (50)	e. SP (50)	f. USC (-50)		Scores	Total Scores	Winner	Runners up
POOL A	1	Play 1														
		Play 2														
		Play 3														
	2	Play 1														
		Play 2														
		Play 3														
	3	Play 1														
		Play 2														
		Play 3														
	4	Play 1														
		Play 2														
		Play 3														

SC=Successful crossing
SP= Successful parking
USP= Unsuccessful parking

Table 3.2.4: Qualifying Round

Date	Match No.	Matches
May 30, 2019	XIII	Winner of Pool A vs Runners of Pool B
	XIV	Runners of Pool A vs Winner of Pool B
	XV	Winner of Pool C vs Runners of Pool D
	XVI	Runners of Pool C vs Winner of Pool D

Table 3.2.5: Semi-Final

Date	Match No.	Matches
May 31, 2019	XVII	Winner of Match XIII vs Winner of Match XV
	XVIII	Winner of Match XIV vs Winner of Match XVI

Table: 3.2.4: Third Place

Date	Match No.	Matches
May 31, 2019	XIX	Loser of Match XVII vs Loser of Match XVIII

Table: 3.2.5: Final

Date	Match No.	Matches
May 31, 2019	XX	Winner of Match XVII vs Winner of Match XVIII

3.3. Terms of Reference for Judges

a. A panel of judges comprising of officials from relevant organizations and agencies without any affiliation to the participating school shall administer the matches.
b. Judges shall report to the National STEM Olympiad venue by **9.00 AM on May 28, 2019** and meet overall coordinator (Mr. Bhoj Raj Rai, STEM unit, REC) to discuss, finalise, and familiarize the assessment tool to evaluate the prototype.
c. Judges to ensure that the prototypes are assessed with utmost integrity, efficiency and quality using the assessment tools and techniques.
d. All the prototypes must be evaluated by every judge.
e. The points awarded for each prototype must be clear, signed if over-written, and summed correctly using PENS only.
f. The consolidated score sheet for all the prototypes must be duly signed by all the judges clearly stating the position secured by each team.
g. The award of points by the judges is final and binding.
h. TA/DA shall be paid as per the existing RGoB financial rules.

B. Symposium

Generally, symposium is platform for the discussion of some subjects or expression of opinion on a topic or issue before the audiences. During symposium several speakers talk on a topic of their interest on an assigned theme and deliberate on the topic with the audience.

The symposium serves as a forum for informing the audience, crystallizing opinions, and in general preparing the listeners for arriving at decision, values, judgment, and understanding of the subject presented.

The theme for the symposium 2019 is "***Artificial Intelligence for Gross National Happiness***".

1. Objectives:

The objectives of the symposium are to:

- ✓ provide a broader understanding of contributions made by STEM Education in achieving **Gross National Happiness.**
- ✓ provide opportunity to the participants to discuss and understand the challenges in the field of Artificial Intelligence.
- ✓ create a platform for teachers and students to contribute their scholarly works at national level.

2. Procedure:

a. Teachers and students are invited to carry out research on the theme, "***Artificial Intelligence for Gross National Happiness***" and submit the full paper, either electronic or printed copy, to the Royal Education Council on or before **April 2, 2019.** The entries should be accompanied with duly filled ***Registration Form*** attached as *Annexure 1*.

b. The papers submitted will be evaluated and selected by a group of evaluator.

c. Of all the entries received, only **four teachers** and **six students** paper will be selected for presentation during the symposium at the National STEM Olympiad 2019.

d. Two guest speakers from the STEM related background will also be invited to present on the given theme.

e. The result of the selected symposium papers will be declared on **April 12, 2019**

f. Schools are required to obtain the following:

- ✓ Approval from the Dzongkhag/Thromde to participate in the event.
- ✓ Written consent from ***(Annexure 4)*** the parents/guardian to enable students to travel for the symposium.

g. The schools should arrange an escort teacher for the selected student presenter.

h. The decision of the evaluation committee is final and binding.

i. The Royal Education Council reserves the right to publish the content of the selected entries of students and teachers in any media.

3. Guidelines for Symposium

a. The participant must complete or comply with the following formalities.

- ✓ Duly filled Registration Form ***(Annexure 1)*** must be completed and submitted electronically **no later than April 2, 2019.**
- ✓ The ***proposal paper*** must be submitted along with the registration form to Karma Dorji at karmadorji@rec.gov.bt

b. Upon selection of the symposium paper, the participants will receive a confirmation email and a telephone call from Royal Education Council, no later than **April 12, 2019.**

c. Only one presenter will be invited to present their paper. No logistics and other entitlements will be arranged for additional member.

d. Duration of each presentation is strictly limited to 10 minutes and 15 minutes for questions and answers.

e. The exact schedule will be determined after all registrations have been received.

f. The presenters are expected to report on **May 29, 2019** for necessary instruction.
g. Please note that if there is a plan to use PowerPoint, then it must be compatible software version.
h. The symposium is NOT a competition amongst the participants.
i. In the proposal, full definition of acronyms must be written, when used for the first time.
j. All the presenters are expected be in formal dress with *Kabney/Rachu* during the presentation.

4. Award

a. A prize of Nu 7000/- (Seven thousand only) along with the certificate shall be awarded to the speakers of all the selected papers.
b. A memento and a certificate of commendation shall also be presented to the guest speakers.

5. Daily and Travel Allowance

a. Student presenters of the symposium will be paid DSA for journey only.
b. The teacher presenters and the assigned escort teachers of symposium will be paid TA/DSA as per the existing RGoB financial rules.

6. Terms of Reference for Symposium Paper Evaluators

a. Ensure that the proposals are assessed with utmost integrity, using the set criteria.
b. **All** the entries must be evaluated by every evaluator using the rubrics attached.
c. The points awarded for each entry must be clear, signed if over-written, and summed correctly using PENS only.
d. Ensure that the papers indicate original work of students, teachers, and are based on the theme of the Symposium.
e. Judges have right to disqualify and not evaluate any entry if it bears enough evidence that it was not original and or does not adhere to the theme.
f. The evaluators shall receive all the papers by **April 3, 2019** and must complete the evaluation of all the papers on or before **April 10, 2019.**
g. Evaluator shall select 6 papers in student category and 4 papers in teacher category.
h. The selection committee (evaluators and working committee) will finalize 6 papers for student category and 4 papers for teacher category.
i. The evaluators shall submit the results of selected papers to the symposium coordinator on **April 10, 2019.**
j. TA/DA shall be paid to the evaluators as per the existing RGoB financial rules and regulation

Rubrics for the evaluation of Symposium Papers

Criteria	Excellent (4)	Very Good (3)	Good (2)	Satisfactory (1)
Purpose	The writing has a very clear purpose or argument and is readily apparent to the reader throughout the paper.	The writing has a very clear purpose or argument, but sometimes digress from it.	The writing has clear purpose or argument but is inconsistent throughout the paper.	The writing has no clear purpose or argument.
Grounding	The writer's argument and purpose of the study is well grounded on literature, and is also evident from the list of references.	The writer's arguments and purpose of the study is fairly grounded on literature, and is also evident from the list of references.	The writer's argument and purpose of the study are weakly grounded on literature, and is also evident from the list of references.	The writer's argument and purpose of the study are not grounded on literature, and is also evident from the list of references.
Theme	The paper is completely based on the theme of the symposium.	The paper is mostly based on the theme of the symposium.	The paper is partially based on the theme of the symposium.	The paper is not at all based on the theme of the symposium.
Language Standard	Sentences are well-phrased and conveys the main ideas clearly. The writing is free of grammatical errors.	Sentences are well-phrased and conveys the main ideas clearly. The writing has a few grammatical errors.	Sentences are awkwardly constructed and do not clearly convey the main ideas. The writing has many grammatical errors.	Sentence are awkwardly constructed and do not convey the main ideas. The writing has many grammatical errors that meaning is obscured.
Components of Methodology: The data collection activities, data analysis, findings, conclusions, and implications)	All FIVE components are clearly evident.	Any FOUR of these components clearly evident.	Any THREE of these components are clearly evident.	Any TWO of these components are clearly evident.

Score Sheet for Symposium

(Use Pens only for marking)
Remarks: PA refers to points awarded by the evaluator.

Sl. No.	Criteria / Name	Purpose (PA x 3)	Grounding (PA x 4)	Theme (PA x 1)	Language Standard (PA x 2)	Methodology (PA x 5)	Total
1							
2							
3							
4							
5							
6							
7							
8							

Signature of Evaluator:

Evaluator Name: ……

C. Fun Corner

Events happening around us are explained by science. The Fun Corner provides opportunities for visitors to engage in 3D show (scientific documentary), hands-on experiments, mathematical puzzles, and optical illusions. They try out science activities to evaluate and reflect on how science works. The fun corners are provided with problems and procedures to guide in solving the problems.

1. Objectives:

The objectives of the fun corners are:

- ✓ Stimulate visitors to engage in hands-on fun activities.
- ✓ Develop understanding of how science works.
- ✓ Visitors realize that science is fun and recreational.

2. Activities and procedures

In order to attract more audience at the event, a wide range of fun related hands on activities shall be on display. This corner should stimulate or inspire or raise awareness of scientific phenomenon. The audience visit the fun corners and try out the fun activities on display.

Advisory Committee Members

1. Director General, DSE, MoE (Chairperson)
2. Director General, DYS, MoE (Vice Chair)
3. Director, REC
4. Dean, REC
5. Chief TEO, Thimphu Thromde
6. Chief, STEM Division, REC (Member Secretary).
7. Director, FabLab Bhutan, Thimphu
8. Chief DEO, Mongar

ToR for Advisory Committee Members

1. The advisory committee members will meet as and when required or necessary.
2. Vice chairperson shall coordinate the meeting in absence of chairperson.
3. The presence of two-third members will constitute the quorum.
4. Advisory committee shall provide guidance, support and direction for the conduct of STEM Olympiad.
5. The advisory committee shall validate the proposal and grant approval submitted by the STEM division, REC including the financial expenditures.
6. The member Secretary shall inform the date and venue of the meeting and circulate the agenda with relevant documents in advance.
7. All the members are mandated to sign the resolutions taken in all the meetings.

ToR for Working Committee Members

1. Working committee members shall meet and convene the meeting as and when required.
2. Head of the STEM Unit shall lead as the overall coordinator of the working committee members.
3. Dean of CDC shall coordinate and lead the function in absence of the overall coordinator.
4. Respective coordinators shall take lead of the team and carry out the task assigned accordingly.
5. Overall coordinator shall inform the date and venue of the meeting and circulate the agenda with relevant documents in advance.
6. All the members are mandated to sign the resolutions taken in all the meetings.

Annexure 1

Registration Form

National STEM Olympiad 2019

Please write in **BLOCK LETTERS:**

Name of the School:……..……..

Gewog:…….…….

Dzongkhag/Thromde:……..

Name of Mentor Teacher:	
Boys	**Girls**
Name: Class: Student Code No: CID No:	Name: Class: Student Code No: CID No:
Name: Class: Student Code No: CID No:	Name: Class: Student Code No: CID No:
Name: Class: Student Code No: CID No:	Name: Class: Student Code No: CID No:

Name of the Principal Signature

Annexure 2

Proposal Template

1. Title of the Prototype:

2. Rationale:

2.1. Need for the prototype

2.2. Relevance of the prototype to the need identified

2.3. Innovative and unique features about the envisioned prototype

2.4. Job description of the team members

3. Detailed Blueprint of the Prototype:

3.1. Design and innovation

3.2 Coding and function assignment

3.3 Labelled diagram

3.4 Size of the prototype in cm (max. to 60cm X 60cm)

3.5 The size of the robotic field (recommended 14ft X 14ft)

3.6 Working mechanism of the prototype

4. Scientific Concepts Involved:

List and describe the scientific concepts involved with necessary diagrams/ documents/images (videos)

5. References:

(List the sources of information, idea, concepts, etc.)

Annexure 3

List of participants for STEM Olympiad 2019

…… CS/ Higher/Middle Secondary School

Date :…… Name of Escort Teacher:……...…….

The following students will be participating in the upcoming STEM Olympiad

2019 at ……

The bus (transport) will leave the school at …… AM/PM on

…….…….. (date) and return to school at

……. AM/PM on …….……. (date).

List of Participants:

Sl No	Name	Class & Section
1		
2		
3		
4		
5		
6		

(Seal and Signature of Principal) Phone No.:…….

If you have any concerns, please contact:

- *Mr Phuntsho Norbu, REC @ 17370573 (phuntshonorbu@rec.gov.bt)*
- *Mr Karma Dorji, REC@ 17846315 (karmadorji@rec.gov.bt)*

Annexure 4

TRAVEL PERMISSION FORM FOR PARTICIPANTS IN STEM OLYMPIAD-2019

…… CS/Higher/Middle Secondary School

Name of Participant	Contact Number (in case of Emergency)

has my permission to attend in the upcoming STEM Olympiad 2019 at

……...(venue)

The bus (transport) will leave the school at……. AM/pm on…….. (date)

and return to school at…….AM/PM on ……..…. (date).

Name and Signature of Parent/Guardian:

CID No. of Parent/Guardian:

Mobile Number:

Annexure 5

Template for the Exhibit Report

(*To be submitted to the organizer on May 27, 2019)*

Each participating team at the National STEM Olympiad must come up with the detailed original write-ups with the following components:

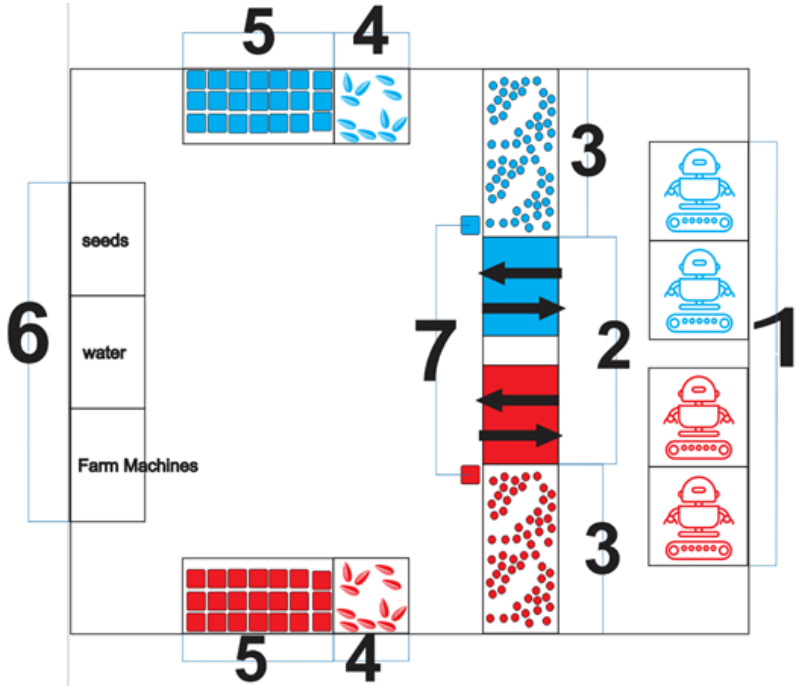
1. **Name:**
   -provide unique name to your model/prototype.
2. **Rationale and purpose:**
   -Briefly state why the model/prototype was chosen, what and how it is significant in our lives.
3. **Scientific principles:**
   -State concepts, relevant laws, theories and principles.
4. **Materials required:**
   -Provide descriptions of the materials used to construct the model/prototype including the type, make, cost, quantity and quality.
5. **Procedures for construction:**
   -Include Illustrations/Drawings/Photographs while describing each step involved in the construction of model/prototype.
6. **Working of Prototype:**
   -Describe the operation and pre-requisite conditions, if any for the working of model/prototype.
7. **Challenges and opportunities:**
   -Describe the limitation and future prospects of the model/prototype.
8. **References:**
   -Provide the list of resources in APA format.
9. **Annexures:**

   -Illustrations/Drawings and Photographs depicting the development of concept, idea and design of prototype.

Annexure 6

Field Description

1. The participating teams shall be clubbed into 8 alliance groups comprising of 2 teams.
2. Alliance teams shall be given blue and red colour before the game begins.
3. The total area of pitch for the match shall be 15 feet by 18 feet as shown in Figure 1.



Legends:

1. Parking
2. Bridge
3. Water ball (TT ball)
4. Seeds
5. Farm machineries
6. Barren Land
7. Key cubes

Figure 6.1: Pitch Field

Criteria for award of points

a. Each Water (Table tennis balls) loaded perfectly will give the team 5 points
b. Deploying Farming machines (cubes) shall be given the team 10 points each.
c. Implanting seed (card board) perfectly shall be given the team 10 points each.
d. During the match, the team can decide to park their robot to the parking area or not. The key box is the key to cross the bridge. For the successful crossing of the bridge and proper parking will fetch the team 50 points each. But in the attempt to do so, if the robot falls off the bridge, the team shall lose 50 points from the team account.

Reminder

- Cubes, cardboards and balls must be loaded from their loading area.
- All the team members should be behind the initial robot parking area.
- Cubes, cardboards and balls must be deported to their respective barren land via their respective gate.
- The pitch field will be surrounded by 5 officials to monitor the whole game.
- The teams should be mindful not to focus on one resource only. They must at least use one from each resource. Failing to do so, the team won't be getting any points
- No human players will be involved in the game field excluding the controllers.
- Self-presentation, teamwork and corporation are a key goal of the whole game.
- The decision of referee is final and binding.

Annexure 7

For further information, please contact the following:

Advisor	
Mr Kinga Dakpa, Director, REC	Mr. Wangpo Tenzin DEAN, CDC, REC
Programme Coordinator	
Mr. Bhoj Raj Rai STEM Unit Head, CDC, REC Email: bhojrajrai@rec.org.bt Mobile: 17642838	
Event Management Coordinators:	**Food and Refreshment Coordinator**
Mr Geewanath Sharma, CDC, REC Email: geewanth@rec.gov.bt Mobile: 17635797	Mr Sonam Tshering, CDC, REC Email: sonamtshering@rec.gov.bt Mobile:17893135
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